To: Tina Laidlaw/MO/R8/USEPA/US@EPA;"Suplee, Mike" [msuplee@mt.gov]; Suplee, Mike" [msuplee@mt.gov]; LaVigne, Paul" [plavigne@mt.gov]
From: "Blend, Jeff"
Sent: Tue 7/5/2011 8:08:04 PM
Subject: Updated table
MT S_W Demonstrationw_TinaJeff (2).xlsx

Okay, this is the last one I will send today. On this updated table with updated numbers and corrections, we look at seven towns and what it would take to meet the base criteria. Data is given for another five towns as to what it would take to meet less stringent standards. I made a few corrections on the table and double checked these with Tina. What we have is four out of six large towns over 2% MHI. Helena and Kalispell are both above 1.5%. Costs do not include labor, so they are underestimated in that aspect. Also, cost numbers are starting from scratch, so they may be over or under estimated from what developed plants would have to pay. We may get more sit specific numbers on Billings.

Phillipsburg is off the map for a high MHI.

I added column for what the increase would be in current wastewater bills. I was surprised by how high those numbers were. I am tired of looking at this today, but great work was done by all. This spreadsheet is the current version.

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Community	Current Treatment Technology	Would the criteria apply? Or is there dilution capability?	Community Population	Number of Households (Population / 2.5) based on 2000 Census	Median Household Income (2010) - countywide MHI. Recommend updating for service area.	Current average household sewer bill per year (2008 / 2011)	Current average sewer fee as % of MHI
Kalispell	BNR (modified Johannesburg); 3.1 to 5.4 MGD; avg. .12 mg/l TP; 10 mg/l TN.	EOP; Ashley Creek	27,544	10,012	$45,594.00	$216.00	0.47%
Bozeman	some BNR now; 5-stage Barrdenpho; new plant will be BNR (1 mg/l TP; 3 mg/l TN starting in 2011); current 5.8 MGD; increasing to 13.9 mgd	Yes. Also Gallatin TMDL in the works.	37,280	14,614	$47,065.00	$372.00	0.79%
Helena	BNR; 3 mg/l TP; 10 mg/l TN; design capacity of 5.4; current discharge ~3.0 MGD	Yes. WLA set in TMDL based on numeric criteria.	28,190	12,337	$52,317.00	$265.44	0.51%
Butte	Technology is activated sludge (TN of 18.5 mg/l; TP of 2.11 mg/l); under Order to Construct to membrane BNR; current design is 8.5 MGD; talking about lowering to 6.1 MGD	Yes. EOP.	33,525	14,041	$40,055.00	$162.00	0.40%
"Big 7" Communities that Discharge to Large Rivers - criteria wouldn't apply							
Missoula	advanced secondary treatment facility with biological nutrient removal and ultraviolet disinfection; 6-9 MGD	SSC; should Missoula be included?	108,623	28,290	$40,130.00	$152.14	0.38%
Great Falls	conventional 2ndary activated sludge (max 21-MGD; avg. 10 MGD)	Missouri River	82,178	23,998	$40,434.00	$187.20	0.46%
Billings	2ndary treatment; Design flow of 26 MGD (avg.) and 40 MGD max.	N/A. Discharge into the Yellowstone River.	104,170	41,841	$45,004.00	$218.28	0.49%
Smaller Communities with Lower MHIs							

Philipsburg	7th sequential batch reactor tank	Yes.	820	399	35806.00	200	0.56%

ıs below this row include cost data that refer to nutrient removal levels that are at least one order of magnitude less stringent than Base Numeric Nutrient Criteria

Cut Bank		Yes	2,869	1,290	$29,000	$138.48	0.48%
Deer Lodge		Yes	3,111	1,522	$40,320	$409.56	1.02%
Manhattan		Yes	1,520	523	$50,729	$362.40	0.71%
Columbia Falls		Yes	4,688	1,621	$38,750	$279.00	0.72%
Circle							
Glendive							
Redlodge			9,756.00		$40,379	305.28	
Havre			16,632.00		$38,082	240.00	
Montana City							
Big Fork							

Highwood Belgrade	?? Separate WWTP? Part of gallaitin county.					313.80	

NOTE: Operation costs include energy and chemical costs only and do not include labor and maintenance cost. As such, these numbers are on the low side.

NOTE: The numbers are intended to provide ROUGH ESTIMATES for discussion purposes and do not reflect the site-specific conditions at each plant.

NOTE: Capital costs were assumed to cover a 20-year bond with 5% interest (used 0.0802 conversion factor)

NOTE: MHI is based on data available on: http://www.ers.usda.gov/data/unemployment/RDList2.asp?ST=MT&SF=11A. These MHI values are lower than DEQ's values. For exam

NOTE: Brine disposal costs are estimated based on calculations developed by Region 5. The city of Madison's plant was used at the basis for the calculation since it was 3 MGD. Th

draft numbers pending input

final draft numbers

Notes	Capital cost (million dollars) to meet the numeric nutrient criteria (WERF)	Annual Capital cost to meet the numeric nutrient criteria (L4 WERF)	Annual Operations costs to meet the numeric nutrient criteria L4WERF	Annual Capital and Operations cost ($)	Annual Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Base Numeric Nutrient Criteria (plus current wastewater fees)	Percent increase in Wastewater bill
Sewer rates obtained from City in 2011. Plant ~WERF Level 2.	$49.14	$3,941,028.00	1,228,530.00	$5,169,558.00	$516.34	$732	1.61	239%
Sewer rates obtained from City in 2011. Plant ~WERF Level 2. Really Level 3 for TN and 1 for TP	$102.12	8,190,024.00	1,684,610.00	$9,874,634.00	$675.70	$1,048	2.23	182%
Sewer rates obtained from City in 2011. Plant ~ WERF Level 1.	$67.50	$5,413,500.00	1,188,900.00	$6,602,400.00	$535.17	$801	1.53	202%
Sewer Fee based on DEQ estimtes. Sewer Fee based on DEQ estimtes. Included $27 million upgrade in new capital costs which would bring them to 5 TN and 0.1 TP	$133.75	$10,726,750.00	1,731,200.00	$12,457,950.00	$887.26	$1,049	2.62	548%
and Great Falls (population, treatment levels, etc.) were obtained from HDR.	$312.50	$25,062,500.00	$11,252,800.0	$36,315,300.00	$1,513.26	$1,700	4.21	808%
The numbers for Billings and Great Falls (population, treatment levels, etc.) were obtained from HDR.	$312.50	$25,062,500.00	$11,252,800.0	$36,315,300.00	$867.94	$1,086	2.41	398%

lagoon to simple mechanical system - ref: Gary Swanson, consulting engineer- 15TN, 2TP	$63.75	$5,112,750.00	1,341,680.00	$6,454,430.00	$16,176.52	$16,377	45.74	8088%

hat are at least one order of magnitude less stringent than Base Numeric Nutrient Criteria

4000 gallons. Base rate $9.48 at 3000 gallons plus $2.06 for next 1,000 gallons	$12.50	$1,018,540.00	1,341,680.00	$2,360,220.00	$1,829.63	$1,968	6.79	1321%
to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark	$15.25	$1,261,145.00	602,000.00	$1,863,145.00	$1,224.14	$1,634	4.05	299%
Mainly designed to remove ammonia and some TN, but now have NO3 limit. May be able to meet with operational changes. TP of 2 mg/l may require more capital & O&M expenses. Ref: planning document, SRF loan application	$7.56	$606,312.00	100,000.00	$706,312.00	$1,350.50	$1,713	3.38	373%
Upgrade to an existing Chemical P-removal plant - actual effluent concentrations are 4 TN and 0.05TP	$3.92	$315,186.00	75,000.00	$390,186.00	$240.71	$520	1.34	86%
Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.								
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Sewer Fee based on DEQ estimtes.							

ple, the USDA site showed the MHI for Cutbank at $29,000 compared to DEQ's estimates of $43,000. I inserted DEQ's MHI values into the table for Cutbank and the %MHI reduced from 3 to 2 is is a VERY rough estimate.

.14%.

WERF

Level	Description	Capital Cost ($/gpd)	Operations ($1,000/yr/10 MG Treated)
Level 1	No N and P removal	9.3	250
Level 2	1 mg/l TP; 8 mg/l TN	12.7	350
Level 3	0.1-0.3 mg/l TP; 4-8 mg/l TN	14.4	640
Level 4	<0.1 mg/l TP; 3 mg/l TN	15.3	880
Level 5	<0.01 mg/l TP; 1 mg/l TN	21.8	1370

Costs to Meet Criteria	Capital Cost($million/MGD)	Design Flow	Facility Upgrade Capital Costs ($million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; $million/year)
Kalispell	9.1	5.4	$49.14	$3.94
Bozeman	7.4	13.8	$102.12	$8.19
Helena	12.5	5.4	$67.50	$5.41
Butte	12.5	8.5	$106.25	$8.52
Philisburg	12.5	5.1	$63.75	$5.11
Billings	12.5	25	$312.50	$25.06
Great Falls	12.5	25	$312.50	25.0625

Annualized Capital Costs (Assumed 20-yr bond & 5% interest; $million/year)	Operations ($1/ MG/day Treated)	Operations Costs ($/ year/ 1 MGD)	Actual Flow	Facility Upgrade Operations Costs ($/year/1 MGD) based on Facility MGD	Membrane Replacement Cost ($24,000 /yr/1 MGD)*Actual Flow
$3,941,028.00	1020	372,300.00	3.10	1,154,130.00	74,400.00
$8,190,024.00	730	266,450.00	5.80	1,545,410.00	139,200.00
$5,413,500.00	1020	372,300.00	3.00	1,116,900.00	72,000.00
$8,521,250.00	1120	408,800.00	4.00	1,635,200.00	96,000.00
$5,112,750.00	1120	408,800.00	3.10	1,267,280.00	74,400.00
$25,062,500.00	1120	408,800.00	26.00	10,628,800.00	624,000.00
$25,062,500.00	1120	408,800.00	26	10,628,800.00	624,000.00

Total Operations costs including membrane replacement
1,228,530.00
1,684,610.00
1,188,900.00
1,731,200.00
1,341,680.00
11,252,800.00
$11,252,800.00

Community	Expected % MHI w/o brine	Expected % MHI with brine
Kalispell		
Bozeman		
Helena		
Butte		